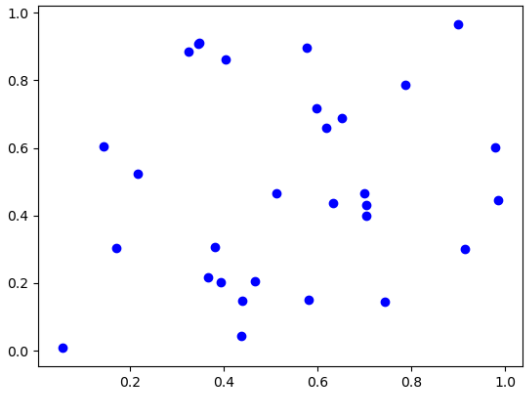
1. Determine the appropriate model for the graph of points below.



A. Exponential model

B. Linear model

C. Logarithmic model

D. Non-linear Power model

E. None of the above

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2. For the scenario below, use the model for the volume of a cylinder as $V = \pi r^2 h$.

Pringles wants to add 31 percent more chips to their cylinder cans and minimize the design change of their cans. They've decided that the best way to minimize the design change is to increase the radius and height by the same percentage. What should this increase be?

A. About 9 percent

B. About 3 percent

C. About 14 percent

D. About 16 percent

E. None of the above

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3. Solve the modeling problem below, if possible.

A new virus is spreading throughout the world. There were initially 3 many cases reported, but the number of confirmed cases has tripled every 5 days. How long will it be until there are at least 10000 confirmed cases?

A. About 37 days

B. About 41 days

C. About 22 days

D. About 21 days

E. There is not enough information to solve the problem.

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4. Solve the modeling problem below, if possible.

In CHM2045L, Brittany created a 28 liter 19 percent solution of chemical χ using two different solution percentages of chemical χ. When she went to write her lab report, she realized she forgot to write the amount of each solution she used! If she remembers she used 5 percent and 27 percent solutions, what was the amount she used of the 5 percent solution?

A. $17.82 liters$

B. $10.18 liters$

C. $14.00 liters$

D. $11.65 liters$

E. There is not enough information to solve the problem.

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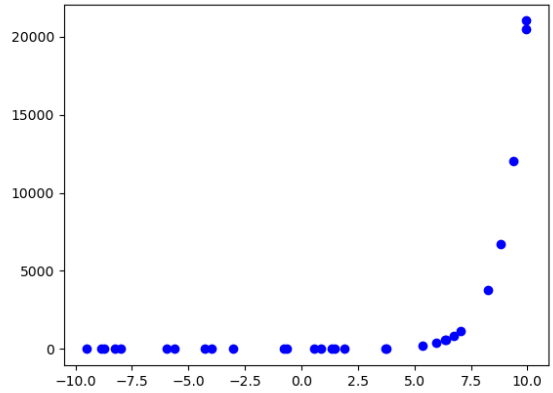
5. Determine the appropriate model for the graph of points below.



A. Non-linear Power model

B. Linear model

C. Logarithmic model

D. Exponential model

E. None of the above

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6. The temperature of an object, T, in a different surrounding temperature T_s will behave according to the formula $T(t) = Ae^{kt} + T_s$, where t is minutes, A is a constant, and k is a constant. Use this formula and the situation below to construct a model that describes the uranium's temperature, T, based on the amount of time t (in minutes) that have passed. Choose the correct constant k from the options below.

Uranium is taken out of the reactor with a temperature of 100° *C and is placed into a* 10° *C bath to cool. After 21 minutes, the uranium has cooled to* 37° *C.*

A. $k = -0.02800$

B. $k = -0.02854$

C. $k = -0.06235$

D. $k = -0.04752$

E. None of the above

7. Solve the modeling problem below, if possible.

A new virus is spreading throughout the world. There were initially 8 many cases reported, but the number of confirmed cases has doubled every 2 days. How long will it be until there are at least 1000000 confirmed cases?

A. About 10 days

B. About 34 days

C. About 24 days

D. About 9 days

E. There is not enough information to solve the problem.

8. Using the scenario below, model the population of bacteria α in terms of the number of minutes, t that pass. Then, choose the correct approximate *(rounded to the nearest minute)* replication rate of bacteria-α.

A newly discovered bacteria, α, is being examined in a lab. The lab started with a petri dish of 3 bacteria-α. After 1 hours, the petri dish has 15 bacteria-α. Based on similar bacteria, the lab believes bacteria-α doubles after some undetermined number of minutes.

A. About 286 minutes

B. About 238 minutes

C. About 47 minutes

D. About 39 minutes

E. None of the above

9. For the scenario below, use the model for the volume of a cylinder as $V = \pi r^2 h$.

Pringles wants to add 38 percent more chips to their cylinder cans and minimize the design change of their cans. They've decided that

the best way to minimize the design change is to increase the radius and height by the same percentage. What should this increase be?

A. About 19 percent

B. About 17 percent

C. About 11 percent

D. About 3 percent

E. None of the above

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10. Solve the modeling problem below, if possible.

In CHM2045L, Brittany created a 29 liter 21 percent solution of chemical χ using two different solution percentages of chemical χ. When she went to write her lab report, she realized she forgot to write the amount of each solution she used! If she remembers she used 19 percent and 31 percent solutions, what was the amount she used of the 31 percent solution?

A. $4.83 liters$

B. $24.17 liters$

C. $10.44 liters$

D. $14.50 liters$

E. There is not enough information to solve the problem.
